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(71) Applicant: NIHON DENKI KABUSHIKI KAISHA

(72) Inventor: Tokio Masada

10

(57) [Abstract]

[Object] To enable an MIB containing a part of the management information virtually to be managed from other NMS.

15 [Constitution] A service MIB generating/annihilating portion 12 generates a service MIB 13-1 upon a partial management start request from other NMS 2-1. A service MIB access portion 16 makes an MIB access request to a system MIB access portion 16 by referring to the service MIB 13-1
20 and making mapping with a system MIB 17. An update notification portion 15 makes an update notification to a self NMS integrated manager 18 and other NMS 2-2, when updating the service MIB 13-1, and makes an update notification to other NMS 2-2 when updating the system MIB
25 17.

[Advantages] There is no need for gaining access to an enormous amount of management information at a referenced

system. The inclusion relation or identifier may be changed artificially to make the management.

[Claims for the Patent]

[Claim 1]

A network management system comprising a service MIB
generating/annihilating portion for generating a service
5 MIB for other NMS (Network Management System) by referring
to the service MIB (Management Information Base) generating
information of said other NMS and a system MIB upon
accepting a partial management start request from said
other NMS that is other network management system, or
10 annihilating the service MIB for said other NMS upon
accepting a partial management end request from said other
NMS.

[Claim 2]

A network management system comprising a service MIB
15 access portion for making an MIB access request to a system
MIB access portion by referring to a service MIB for other
NMS and making mapping with a system MIB upon an MIB access
request from said other NMS.

[Claim 3]

20 A network management system comprising an event
distributing portion for distributing an MIB access request
to a service MIB access portion or a system MIB access
portion in accordance with an originator upon receiving an
MIB access request from other NMS or self NMS integrated
25 manager.

[Claim 4]

A network management system comprising:

a system MIB access portion for updating a system MIB and making an update notification request to an update notification portion upon an MIB access request from a service MIB access portion or an event distributing
5 portion; and

said update notification portion for determining the necessity of update notification to self NMS integrated manager and other NMSs and making an update notification to said self NMS integrated manager and said other NMSs upon
10 an update notification request from said system MIB access portion.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

15 The present invention relates to a network management system for managing a network.

[0002]

[Prior Art]

In the conventional network management system (NMS),
20 when other NMS refers to the management information managed by self NMS, self NMS becomes an agent of other NMS, and other NMS directly refers to the entire management information managed by self NMS as the retrieval object.

[0003]

25 [Problems to be Solved by the Invention]

In the case where the user employs a part of a large network such as VAN, there is the possibility that the user

already has a network of one's own apart from the VAN, and
operate the own NMS. In such case, it is conceived that
a part of the network resources for a certain NMS may be
managed from other NMS, such that the NMS of the user refers
5 to a part of the management information for the VAN. In
the present situation, however, in the conventional network
management system, when the information is exchanged
between the NMSs, it is required to place the NMSs in a
relation of a manager and an agent, whereby there is a
10 drawback that the partial information can not be exchanged
between the NMSs at equivalent standpoints.

[0004]

Accordingly, when a part of the network resources for
a certain NMS is managed from other NMS, it is required to
15 construct a relation of the manager and the agent between
the NMSs, and integrate them as one NMS. Namely, it is not
possible for an upper-level integrated manager to
integrally manage a large network by not making each NMS
a complete agent for the integrated manager, but strictly
20 positioning the NMS as the manager to manage each area.
Thereby, there are the following disadvantages.

[0005]

In the case where the referenced side is a large network,
the referencing side is required to deal with an enormous
25 amount of management information, and may accept an
unnecessary amount of information, in addition to necessary

information as the retrieval result depending on the reference conditions.

[0006]

A new integrated manager must refer to the existing
5 NMS as the agent. In the case where the structure of management information is greatly different depending on the NMS, it is required to coordinate the structure of management information on the referencing side and the referenced side. Therefore, the integrated manager has an
10 increased load of management AP when the integrated manager absorbs its difference.

[0007]

It is conceived in some cases that all the management businesses already operated on each integrated manager are
15 transferred to a new integrated manager. With the conventional method, it is difficult to integrate the existing NMSs while the existing manager continues to operate a part of the management businesses conducted on the existing NMSs.

20 [0008]

[Means for Solving the Problems]

A first invention provides a network management system comprising a service MIB generating/annihilating portion for generating a service MIB for other NMS (Network
25 Management System) by referring to the service MIB (Management Information Base) generating information of the other NMS and a system MIB upon accepting a partial

management start request from the other NMS that is other network management system, or annihilating the service MIB for the other NMS upon accepting a partial management end request from the other NMS.

5 [0009]

Also, a second invention provides a network management system comprising a service MIB access portion for making an MIB access request to a system MIB access portion by referring to a service MIB for other NMS and making mapping
10 with a system MIB upon an MIB access request from the other NMS.

[0010]

Also, a third invention provides a network management system comprising an event distributing portion for
15 distributing an MIB access request to a service MIB access portion or a system MIB access portion in accordance with an originator upon receiving an MIB access request from other NMS or self NMS integrated manager.

[0011]

20 Moreover, a fourth invention provide a network management system comprising a system MIB access portion for updating a system MIB and making an update notification request to an update notification portion upon an MIB access request from a service MIB access portion or
25 an event distributing portion, and the update notification portion for determining the necessity of update notification to self NMS integrated manager and other NMSs

and making an update notification to the self NMS integrated manager and the other NMSs upon an update notification request from the system MIB access portion.

[0012]

5 [Embodiments]

The preferred embodiments of the present invention will be described below with reference to the accompanying drawings. Figure 1 is a block diagram showing an embodiment of a network management system of the invention. The
10 network management system of the invention consists of a self NMS 1 connected to other NMSs 2-1 and 2-2, and within the self NMS 1, an event distributing portion 11, a service MIB generating/annihilating portion 12, the service MIBs 13-1 and 13-2, a service MIB access portion 14, an update
15 notification portion 15, a system MIB access portion 16, a system MIB 17, a self NMS integrated manager 18, and the service MIB generation information 19-1 and 19-2, as shown in Figure 1.

[0013]

20 Note that the MIB (Management Information Base) is a function for holding the information of managed object. Also, other NMS 2-1, 2-2 is the user who uses the functions provided by the self NMS 1, and there is no limitation in the number of users.

25 [0014]

The event distributing portion 11 distributes an event to the internal processes in accordance with its originator

and the contents, upon receiving an event from other NMS 2-1, 2-2 and the self NMS integrated manager 18. The service MIB generating/annihilating portion 12 generates the service MIB 13-1, 13-2 by referring to the service MIB generation information 19-1, 19-2 and the system MIB 17 in accordance with a service MIB generating instruction from other NMS 2-1, 2-2.

[0015]

Note that the service MIB generation information 19-1 is the information for generating the service MIB 13-1 referred to by other NMS 2-1, and the service MIB generation information 19-2 is the information for generating the service MIB 13-2 referred to by other NMS 2-2. The service MIB generation information 19-1, 19-2 is defined as the SG information corresponding to other NMS 2-1, 2-2 at the time of system generation, or notified as the miscellaneous information associated with the partial management start request from other NMS 2-1, 2-2.

[0016]

Also, the system MIB 17 holds the management information of self network as a whole. The service MIB 13-1 is referred to and updated by the service MIB access portion 14 and the update notification portion 15. The service MIB 13-1 is an excerpt or artificial alteration of a part of the management information from the system MIB 17. And the service MIB access portion 14 makes an MIB access request to the system MIB access portion 16 by

referring to the service MIB 13-1 and mapping with the system MIB 17 upon an MIB access request from other NMS 2-1.

[0017]

On the other hand, the update notification portion 15
5 makes an update notification to other NMS 2-2 upon an update request from the system MIB access portion 16. Also, the system MIB access portion 16 refers to or updates the system MIB 17 and makes an update notification to the update notification portion 5 upon an MIB access request from the
10 service MIB access portion 14 or the event distributing portion 11.

[0018]

The self NMS 1 manages the self network, and the self NMS integrated manager 18 integrally manages the self
15 network. Also, other NMS 2-1 manages other network, and is the user of the service MIB 13-1. Other NMS 2-2 manages other network, and is the user of the service MIB 13-2.

[0019]

The operation of the invention will be described below.
20 First of all, the event distributing portion 11 delivers an event to the service MIB generating/annihilating portion 12, if the accepted event is a partial management start request or a partial management end request, delivers an event to the service MIB access portion 14 when the
25 originator is other NMS 2-1, 2-2 when viewing it, or delivers an event to the service MIB access portion 16, when

the originator is the self MNS integrated manager 18, if the accepted event is an MIB access request.

[0020]

Also, the service MIB generating/annihilating portion
5 12 generates a service MIB 13-1 by referring to the service MIB generation information 19-1 that is present in correspondence to the user, upon accepting a partial management start request from other NMS 2-1. Other NMS 2-1 makes aware of the service MIB 13-1 alone, but is unaware
10 of the system MIB 17. It annihilates the service MIB 13-1 corresponding to other NMS 2-1 upon accepting a partial management end request from other NMS 2-1.

[0021]

Figure 2 is a view showing an inclusive tree in this
15 embodiment. A service MIB generating method will be described below. The self network makes aware of an inclusive tree 21 of system MIB, generating an inclusive tree 23 of service MIB to appear artificially an inclusive tree 22 that other NMS makes aware of, as shown in Figure
20 2.

[0022]

Figure 3 is a diagram showing an artificial change in an inclusive tree structure in this embodiment. Specifically, other NMS 2-1 extracts some managed objects
25 from the system MIB 31, creates an MIB 32 after extraction, reconfigures the MIB to facilitate the management of other NMS 2-1, creates an MIB 33 after reconfiguration, changes

the identifier to facilitate the management of other NMS 2-1, and creates a service MIB 34, as shown in Figure 3.

[0023]

Figure 4 is a diagram showing a correspondence between
5 the inclusive tree and the instance information in this
embodiment. In Figure 4, reference signs A to H denote a
relative identifier of each node. The service MIB 13-1
consists of an inclusive tree 42 of service MIB and the
mapping information to the instance information 43 of
10 system MIB, and does not have the instance information
peculiar to the service MIB.

[0024]

More specifically, the required managed objects are
extracted from the inclusive tree 41 of service MIB and the
15 instance information 43 of system MIB, the inclusive
relation is changed, the relative identifier (A to H in
Figure 4) and the attribute value (data within the instance
information) are changed and presented to other NMS 2-1 and
2-2 as the virtual agent.

20 [0025]

Figure 5 is a diagram showing a mapping between the
inclusive tree of service MIB and the inclusive tree of
system MIB in this embodiment. As shown in Figure 5, the
node tables 51 to 63 are created corresponding to the nodes.
25 And the relative identifier is a name of managed object that
is attached to each node of the inclusive tree, and unique

under the same node. The node ID is an identifier attached uniquely in the entire system to each node.

[0026]

The next relative identifier is the relative
5 identifier of the node directly under the self node in the inclusive tree. The next node ID is the node ID directly under the self node in the inclusive tree. An upper level node table and a lower level node table are chained by the node ID. A node table of service MIB and a node table of
10 system MIB employ the same node ID, whereby even if the relative identifier or inclusive relation is changed, the mapping between the service MIB and the system MIB can be made using the node ID.

[0027]

15 Thus, the service MIB access portion 14 makes an MIB access request to the system MIB access portion 16 by referring to the service MIB 13-1 and making mapping with the system MIB 17 upon accepting the MIB access request from other NMS 2-1.

20 [0028]

Also, the system MIB access portion 16 refers to or updates the system MIB 17 upon the MIB access request from the service MIB access portion 14 or the event distributing portion 11, and makes an update notification to the update
25 notification portion 15, if the system MIB 17 is updated.

[0029]

And the update notification portion 15 refers to the service MIB 13-2, if the update notification from the system MIB access portion 16 is the result of MIB access request from other NMS 2-1, and makes the update notification to
5 other NMS 2-2, and to the self NMS integrated manager 18 in accordance with a specification of notification required in the system MIB 17, if the updated object is the managed object of other NMS 2-2 and the update notification required is specified in the service MIB 13-2.

10 [0030]

Also, the update notification portion 15 refers to the services MIB 13-1 and 13-2, if the update notification from the service MIB access portion 14 is the result of MIB access request from the self NMS integrated manager 18, makes the
15 notification to other NMS 2-1, if the updated object is the managed object of other NMS 2-1, or makes the notification to other NMS 2-2, if the updated object is the managed object of other NMS 2-2. In this case, if the notification unrequired is specified in the service MIB 13-1, 13-2, the
20 update notification may not be made. The update notification herein is made in terms of M-EVENT-REPORT notification.

[0031]

[Advantages of the Invention]

25 As above described, the network management system of the invention has the effect that it allows the NMS in other network to manage a part of an enormous amount of

information. That is, to extract the information of resources related to other network from the system MIB, and provide a compact agent, the NMS in other network does not need to make aware of the enormous amount of complex management information over the entire self network. Accordingly, it is possible to provide an application in which the NMS of the VAN user refers to a part of the management information for the VAN.

[0032]

Also, the network management system of this invention has the effect that when the management AP on the NMS in other network makes aware of an inclusive tree structure that is different from the actual inclusive tree structure of the self network, the management information (inclusive relation or identifier) is changed artificially to be beneficial for the management AP on the NMS in the other network, employing the service MIB function, so that the management AP is less changed.

[0033]

Moreover, the network management system of this invention has the effect that when the existing NMS is present, and the management businesses are already operated on individual integrated managers, a part of the management businesses performed on the existing NMS can continue to be operated on the respective existing manager, without integrating all the management businesses. Namely, each agent is not a complete agent of the integrated manager,

but the upper-level manager can make the integral management over the large network, while each agent manages each area as the manager.

[0034]

5 Moreover, the network management system of the invention has the effect that even when the integrated manager of the self NMS and the NMS manage the same managed object in parallel, it is possible to update the management information for the managed object within the MIB, because
10 the event distributing portion distributes an event by determining the originator, the NMS does not need to make aware of whether the access object is system MIB or service MIB, and the update notification portion determines the necessity of update notification to the integrated manager
15 of the self NMS and the other NMS to make the update notification.

[Brief Description of the Drawings]

[Figure 1]

Figure 1 is a block diagram showing an embodiment of
20 a network management system of the present invention.

[Figure 2]

Figure 2 is an inclusive tree in this embodiment.

[Figure 3]

Figure 3 is a diagram showing an artificial change in
25 an inclusive tree structure in this embodiment.

[Figure 4]

Figure 4 is a diagram showing a correspondence between the inclusive tree and the instance information in this embodiment.

[Figure 5]

5 Figure 5 is a diagram showing a mapping between the inclusive tree of service MIB and the inclusive tree of system MIB in this embodiment.

[Reference Numerals and Signs]

1 self NMS

10 2-1, 2-2 other NMS

11 event distributing portion

12 service MIB generating/annihilating portion

13-1, 13-2 service MIB

14 service MIB access portion

15 15 update notification portion

16 system MIB access portion

17 system MIB

18 self NMS integrated manager

19-1, 19-2 service MIB generation information

【図1】

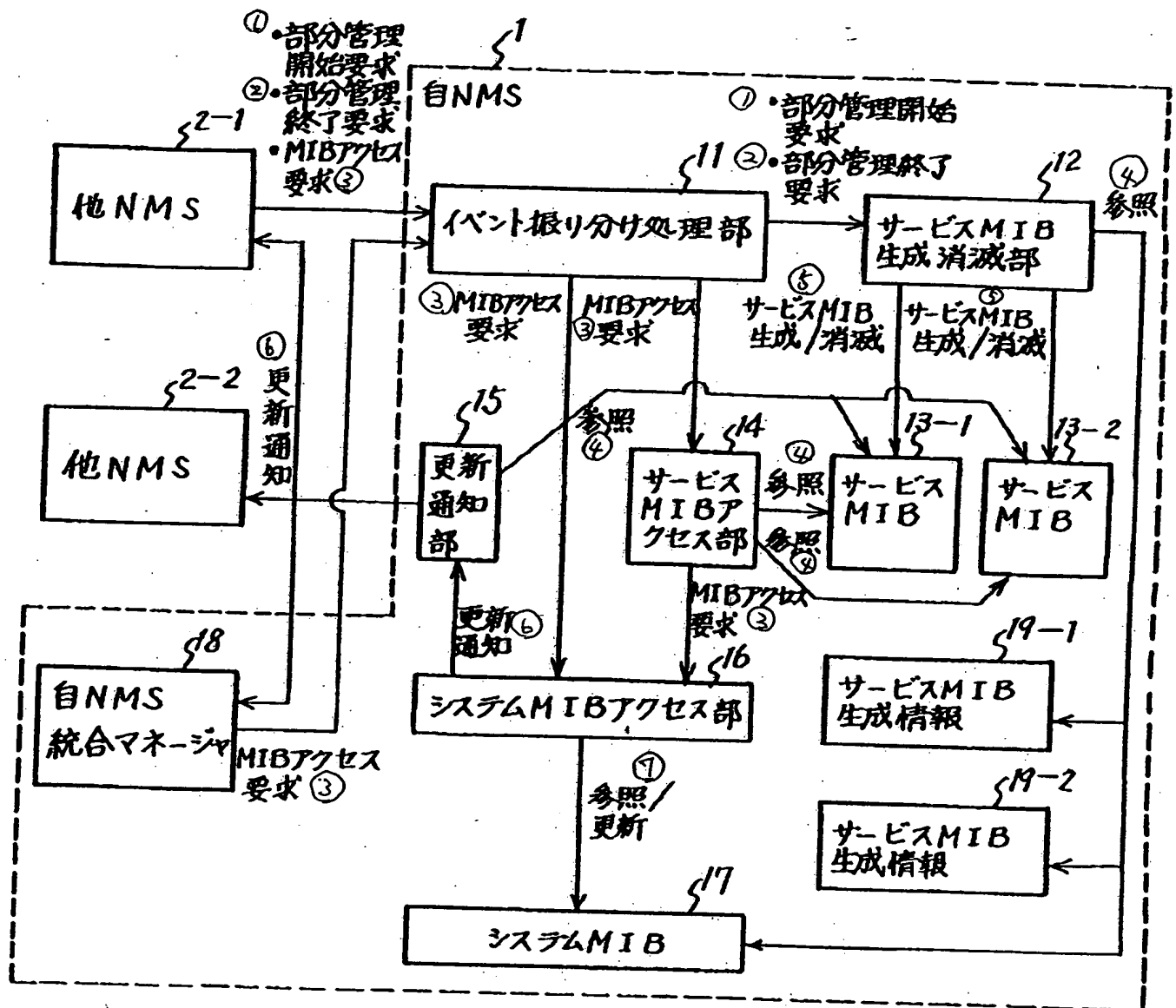


Figure 1

- 1 Self NMS
- 2-1 Other NMS
- 2-2 Other NMS
- 11 Event distributing portion
- 12 Service MIB generating/annihilating portion
- 13-1 Service MIB
- 13-2 Service MIB
- 14 Service MIB access portion
- 15 Update notification portion
- 16 System MIB access portion
- 17 System MIB
- 18 Self NMS integrated manager
- 19-1, 19-2 Service MIB generation information
- ① Partial management start request
- ② Partial management end request
- ③ MIB access request
- ④ Reference
- ⑤ Service MIB generation/annihilation
- ⑥ Update notification
- ⑦ Reference/update

FIG. 2. 【図2】

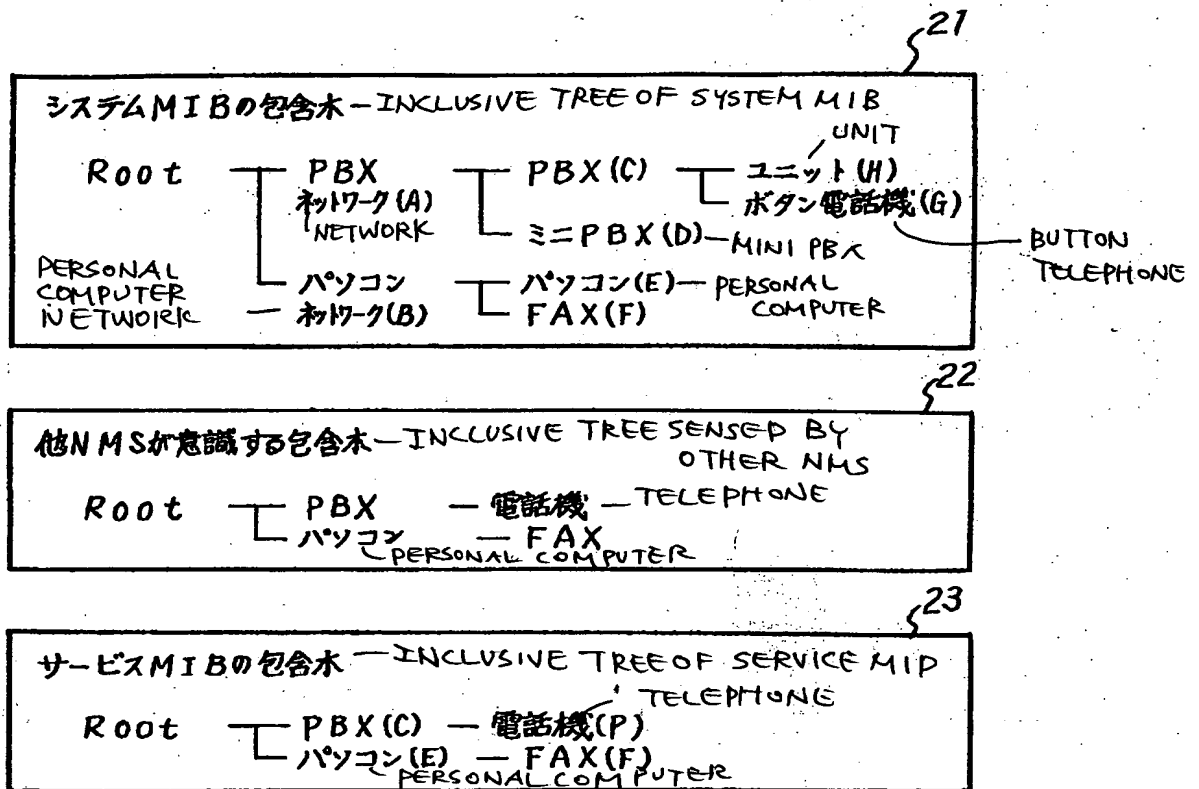
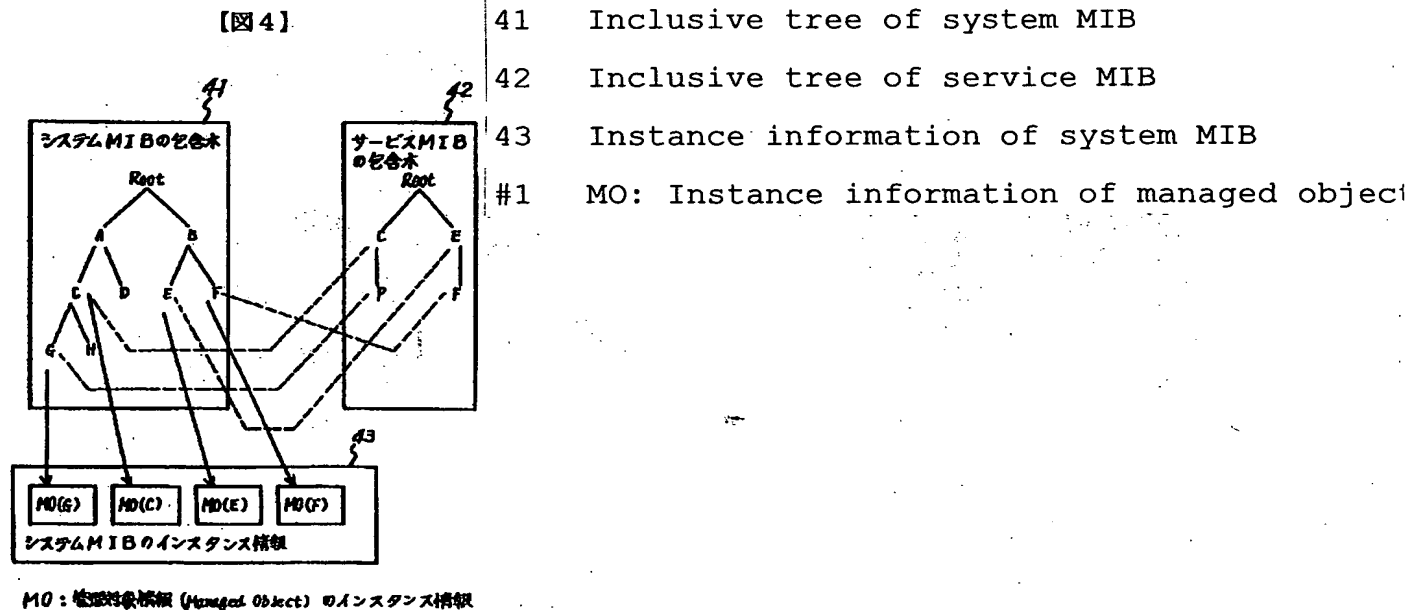


Figure 4



【図3】

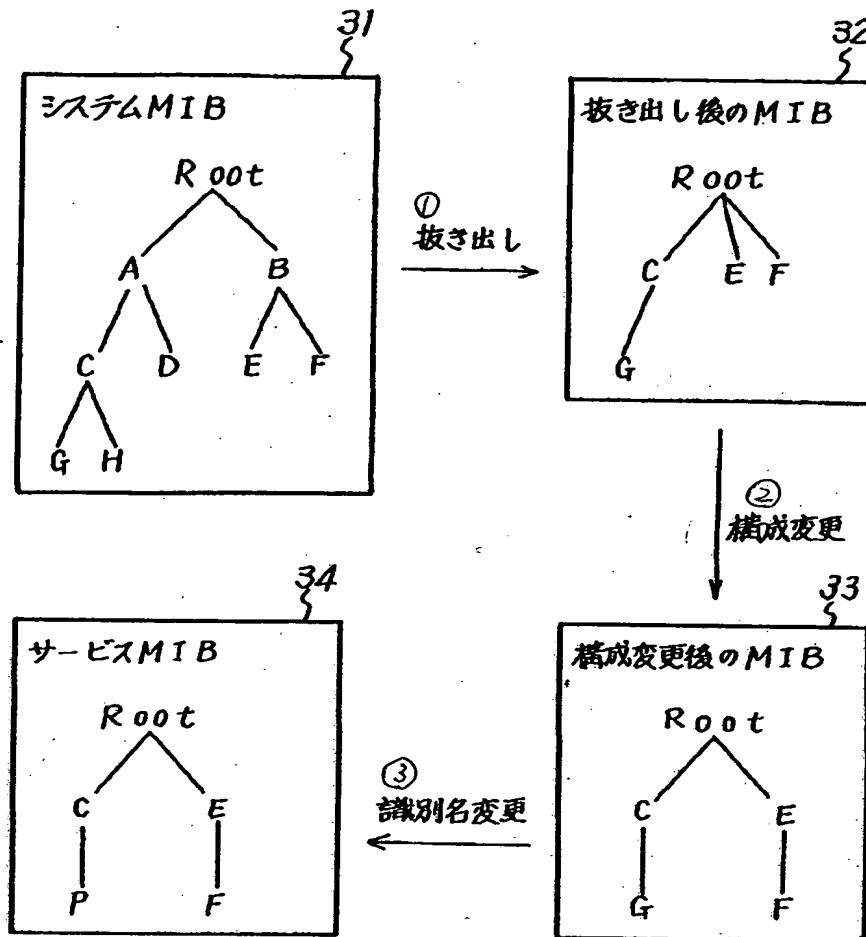
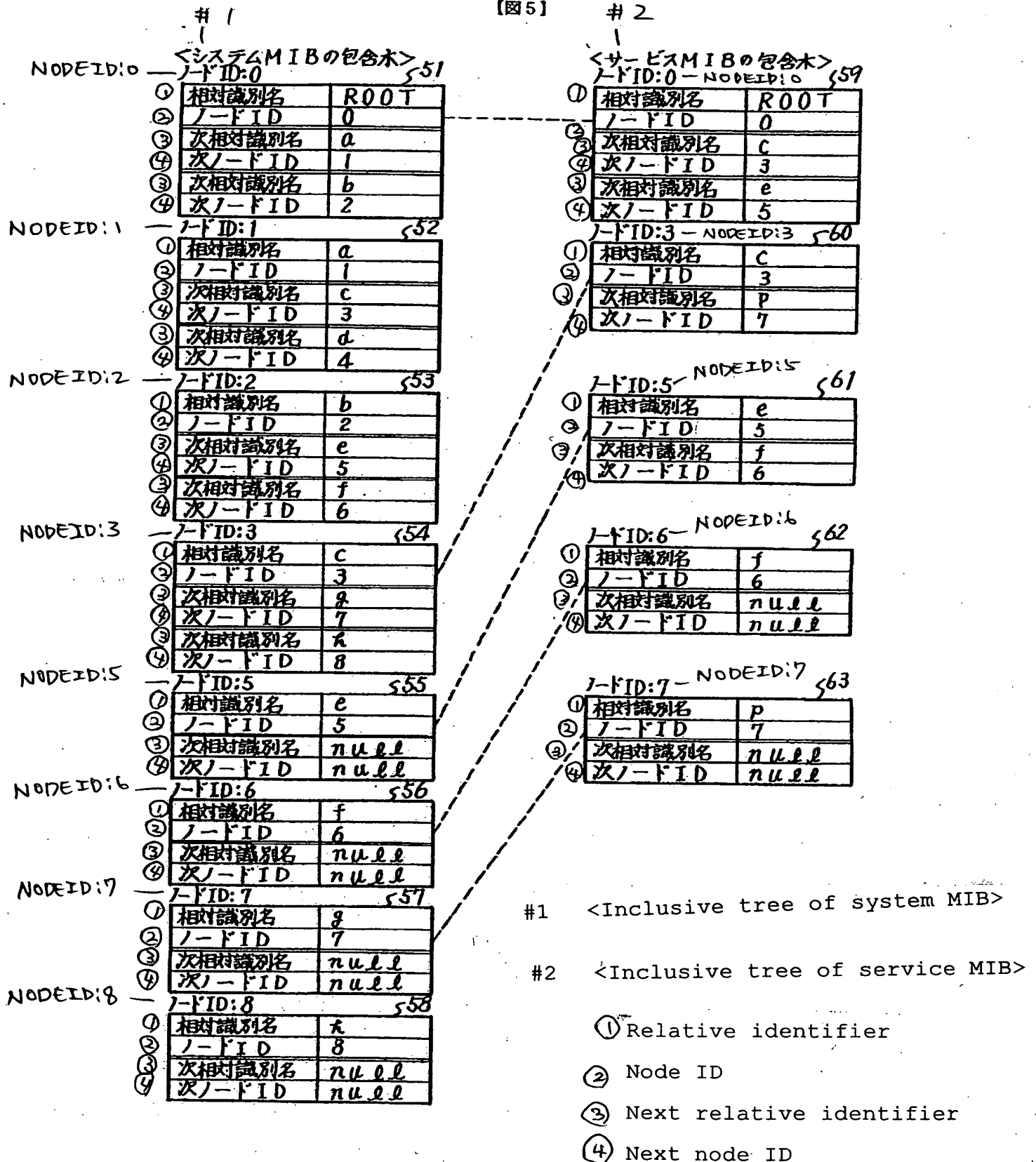


Figure 3

- 31 System MIB
- Extraction
- 32 MIB after extraction
- 33 MIB after configuration change
- 34 Service MIB
- ① Extraction
- ② Change of configuration
- ③ Change of identifier

FIG.5



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